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Abstract

PURPOSE: To reduce an irregularity in a device characteristic due to an irregularity in a film thickness by a method wherein an atomic-layer epitaxial growth operation of Si is executed on a semiconductor substrate by using an organic Si-based gas.

CONSTITUTION: When an organic compound gas of Si where bonding hands of Si atoms 2 are provided with, e.g. ethyl groups 3 is decomposed and the ethyl groups in one part are cut from the Si atoms 2, gas molecules provided with dangling bonds 4 are approached to an Si substrate 1, the ethyl groups 3 on the surface are separated and Si atoms 2A of molecules provided with the dangling bonds 4 are bonded to the outermost surface of the Si substrate 1. The outermost surface side of a first Si layer which has not been bonded to the Si atoms 2 in the substrate is still provided with the ethyl groups 3. When Si compounds provided with one part of the ethyl groups 3 are approached to the dangling bonds 4, they are disconnected from the substrate and the Si atoms 2A provided with the ethyl groups are bonded to the outermost surface. Since the Si compounds provided with the dangling bonds are bonded stably to the Si atoms 2 in the substrate, an epitaxial growth operation which can control an atomic layer can be executed without forming the difference in level on the surface.